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REVIEW OF THE GENUS *CHELIPODA* MACQUART OF AMERICA NORTH OF MEXICO (DIPTERA: EMPIDIDAE; HEMERODROMIINAE)

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Abstract.—The genus *Chelipoda* Macquart is reviewed for America north of Mexico. Descriptions of *C. contracta* Melander, *C. elongata* (Melander) **(Lectotype designated)**, *C. praestans* Melander, *C. sicaria* Melander, *C. americana* (Melander) **(new combination)**, ***Chelipoda limitaria*** n. sp., and ***Chelipoda truncata*** n. sp. are presented. A key to males and females, illustrations of male terminalia, known distributions, and comments on biology and systematics are included.

Key Words: Diptera, Empididae, Hemerodromiinae, *Chelipoda, Phyllodromia*

Adult flies of the genus *Chelipoda* Macquart are very small (body length about 2 mm) and delicate. They possess strong raptorial fore legs, and their legs and body usually are predominantly yellow to yellowish brown. The wings are relatively slender since they lack an anal lobe. *Chelipoda* has been placed in the subfamily Hemerodromiinae, the taxonomy of which was treated by Melander (1902, 1928, 1947). This paper is limited to species of *Chelipoda* of America north of Mexico and includes revised descriptions of known species, descriptions of two new species, a key to male and female adults, known distributions, and comments on biology and systematics. In addition to species treated here, representatives fitting the present concept of *Chelipoda* are reported from: China (Yang and Yang 1990); India, Indonesia, Philippines and Taiwan (Melander 1928); Europe (Chvala and Wagner 1989, Collin 1961, Engel 1956); New Zealand (Collin 1928); and South America (Collin 1933, Lynch Arribalzaga 1878, Smith 1967).

MATERIALS AND METHODS

The present study was facilitated by examination of the large numbers of *Chelipoda* adults added to North American collections since Melander's (1947) revision. The following institutions (acronyms following) loaned the material upon which this work is based: American Museum of Natural History, New York (AMNH); Canadian National Collection, Biological Resources Division, Agriculture Canada, Ottawa (CNC); California Academy of Sciences, San Francisco (CAS); Cornell University, Ithaca (CU); Florida State Collection of Arthropods, Gainesville (FSCA); Helzinki Zoological Museum (HZM); Purdue University Entomological Research Collection (PERC); Snow Museum, University of Kansas, Lawrence (UKL); United States National Museum of Natural History, Washington, D.C. (USNM); University of Minnesota, St. Paul (UMSP); University of New Hampshire, Durham (UNH); University of Wisconsin, Madison (UWM); and Utah State University, Logan (USU).

Specimens also came from the author's collection (MAC).

Specimen examination took place under fiber optic illumination, with study of vestiture facilitated by use of fluorescent lighting. Since coloration and color patterns are in part a consequence of light incidence, examination of antennae and tarsi under a microscope required rotation of specimens. Body length was measured from front of head (exclusive of antennae) to the apex of female cerci and the most distant margin of male terminalia (not their apex since they project anteriorly over the abdomen). Maceration of body parts during the early phase of the study was conducted in an approximately 15% solution of sodium hydroxide heated to about 80 C, but much better preparations were achieved after maceration in 85% lactic acid heated to about 80 C, as described by Cumming (1992). Some specimens prepared by the latter technique subsequently were passed through an approximately 15% solution of sodium hydroxide heated to about 80 C in order to completely remove soft tissue and to effect additional clearing of heavily sclerotized male terminalia.

Special of *Chelipoda* possess a number of characters of taxonomic value. Among the most important is vestiture, the terminology for which is based on McAlpine (1981). The basic form of macrotrichia is a seta (= hollow, articulated epidermal outgrowth), with the following descriptive terms applied to it: hair (= long, slender seta); bristle (= long, stout seta); and setula (= short, stout seta). Setulae on adults of *Chelipoda* typically are black, and may be sharply pointed or bluntly pointed; the latter assume a peglike appearance. The color of antennal segments and arista, distal tarsomeres and postgena is also of taxonomic importance. Relative elongation of the thorax, based on the length of the notopleural suture relative to the length of the scutum, is important and among Nearctic species sorts into two forms: 1) thorax relatively long and slender, in which the notopleural suture is ca. ⅔ the length of scutum; and 2) thorax relatively short and compact, in which the notopleural suture is ca. ½ the length of scutum. Length of the female cercus relative to its basal width helps in diagnosing some species.

Male terminalia are distinctive for each species. Interpretation and terminology in general follows McAlpine (1981) and, specifically, the recent interpretation of genitalic homologies outlined in Cumming and Sinclair (1990). Maceration is required to reveal internal features, but at least some of the diagnostic features are visible on many intact dry-mounted males, especially those collected into alcohol and then either prepared by critical point drying, or by passing through cellosolve and then xylene (Sabrosky 1966). Both lateral and dorsal views of male terminalia are illustrated and each includes details of internal structures.

Genus *Chelipoda* Macquart

Chelipoda Macquart 1823: 148. Type species: *Tachydromia mantispa,* misidentification (orig. des.) (= *vocatoria* Fallen, 1816).

Phyllodromia Zetterstedt 1837: 31. Type species: *Empis melanocephala* Fab. (des. Rondani, 1856: 150).

Chiromantis Rondani 1856: 148 (also as *Chyromantis,* p. 148) (preocc. Peters, 1854). Type species: *Tachydromia vocatoria* Fallen 1816 (orig. des.).

Lepidomya Bigot, 1857: 557, 563. Type species: *Tachydromia mantispa* Panzer, 1806 (= *Empis melanocephala* Fab., 1794). Junior synonym of *Phyllodromia* Zetterstedt, 1837.

Thamnodromia Mik 1886: 278. (unnecessary name change for *Phyllodromia* Zett.).

Litanomyia Melander 1902: 231. Type species: *Sciodromyia mexicana* Wheeler & Melander (Coquillett, 1903: 252).

Lepidomyia Kertesz, 1909: 117. (unjustified emendation of *Lepidomya* Bigot, 1857).

Diagnosis.—Adult flies in the genus *Chelipoda* are very small (body length including terminalia usually 1.8 to 2.2 mm, with females slightly larger than conspecific males), delicate, usually yellow to yellowish brown flies that possess strong raptorial fore legs. Differing from those of other Nearctic Hemerodromiinae, adults of *Chelipoda* possess an antennal arista at least twice as long as the flagellum, an unbranched R_{4+5} vein, and bristles on the laterotergite. Characteristic, but not necessarily diagnostic features of *Chelipoda,* are the male terminalia that project anteriorly over the abdomen and the lack of a sclerotized ovipositor in females.

Description.—Nearctic species of *Chelipoda* agree with the detailed generic description presented by Collin (1961). One minor modification to Collin's description pertains to the fore tibia being ridged beneath. Examination of slide-mounted fore legs revealed that the "ridge" actually is formed by a contiguous series of black setulae, each bent at a right angle toward the apex of the fore tibia.

Remarks.—Two arrangements of wing venation occur among species allied with *Chelipoda* and have provided a prior basis for distinguishing two species groups, given either generic or subgeneric rank. Species possessing crossvein dm-cu, and thus a closed cell dm, have been placed in *Chelipoda* Macquart whereas species lacking crossvein dm-cu, which results in an open cell dm, have been placed in *Phyllodromia* Zetterstedt. This latter taxon has been treated as a genus by Steyskal and Knutson (1981), Collin (1961) and Melander (1947). Although treating *Phyllodromia* as a genus, both Collin (1961) and Melander (1947) commented on the doubtful generic importance of crossvein dm-cu. For the same reason, Tuomikoski (1966) considered *Phyllodromia* as a subgenus of *Chelipoda.* However, since no phylogenetic analysis has demonstrated that "*Phyllodromia*" and "*Chelipoda*" are monophyletic groups, formal designation of *Phyllodromia* as a subgenus is not considered warranted, and all species treated here are placed in *Chelipoda,* without subgeneric designation. Two Palearctic species, *C. albiseta* Zetterstedt and *C. vocatoria* Fallen, once included on species lists from the eastern United States, apparently do not occur in North America.

The identification key relies upon vestiture and male terminalia. Important vestiture applicable to both males and females includes: 1) the presence of either one or two ventral rows of some 16–20 black setulae on the fore femur; and, 2) the presence or absence of a prominent basolateral seta (sometimes two) on the fore coxa. Taxonomic components of male terminalia include: degree of fusion between the hypandrium and epandrium, ranging from separate to completely fused; degree of fusion between each cercus and corresponding epandrial lobe, ranging from separate to completely fused; structure and vestiture of cerci; length and shape of the phallus; length and shape of a pair of epandrial lobes; and, if developed, length and shape of a pair of phallic processes.

Key to Adults of Species of *Chelipoda* Macquart of America North of Mexico

1. Crossvein dm-cu lacking, cell dm-cu open (Fig. 1) 2
– Crossvein dm-cu present, cell dm-cu closed (Fig. 2) 3
2. Phallic process extending ca. ½ length of cercus; subepandrial lobe in-turned apically with tip crossing mid-line and ending in 3 black processes (Fig. 3) ..... *C. americana* (Melander)[a]
– Phallic process extending slightly beyond apex of cercus; subepandrial lobe in-turned apically, but tip lacking 3 black processes apically and not crossing mid-line (Fig. 4) .... *C. limitaria,* new species[a]
3. Fore femur ventrally with 2 complete rows of black setulae (outer row usually containing fewer), flanked laterally by row of ca. 4–5 light brown bristles (Fig. 5) 4
– Fore femur ventrally with only 1 complete row

[a] Reliable characters for identifying females were not discovered (see diagnosis section under both species).

(inner) of black setulae (outer row of fewer, less prominent setulae may exist), flanked laterally by ca. 4–6 light brown bristles (Fig. 6) 6

4. Fore coxa with 1 or 2 prominent setae basolaterally (occasionally dislodged) and row of finer setae continuing distally (Fig. 7); male terminalia subequal to pre-genital segment (Fig. 9); female cercus length and basal width subequal (Fig. 10) ..... *C. contracta* Melander
– Fore coxa lacking prominent seta basolaterally (Fig. 6); male terminalia distinctly longer than pre-genital segment; female cercus ca. 2× longer than basal width (Fig. 11) 5
5. Distal tarsomere brown, remaining tarsomeres yellow; postgena, gena, and occiput black; flagellum dark brown; subepandrial lobe pointed, not strongly sclerotized apically; phallic process and phallus subequal in length (Fig. 12) ..... *C. elongata* Melander
– Tarsomeres yellow; postgena with distinct pale area on mid-ventral aspect that contrasts with darker gena and occiput (Fig. 8); flagellum yellow (male) or light brown (female); subepandrial lobe truncate, strongly sclerotized apically; phallic process ½ length of phallus (Fig. 13) ..... *C. truncata,* new species
6. Phallus slender in dorsal view, in lateral view distal ⅓ sinuate; subepandrial lobe not apparent in lateral view, extending only ca. $\frac{1}{10}$ length of phallus (Fig. 14) ..... *C. praestans* Melander[b]
– Phallus not uniformly slender in dorsal view, in lateral view distal ⅓ abruptly bent; subepandrial lobe well developed, ca. ⅔ length of phallus and bent upward in lateral view (Fig. 15) ..... *C. sicaria* Melander[b]

Chelipoda americana (Melander), New Combination
(Figs. 1, 3)

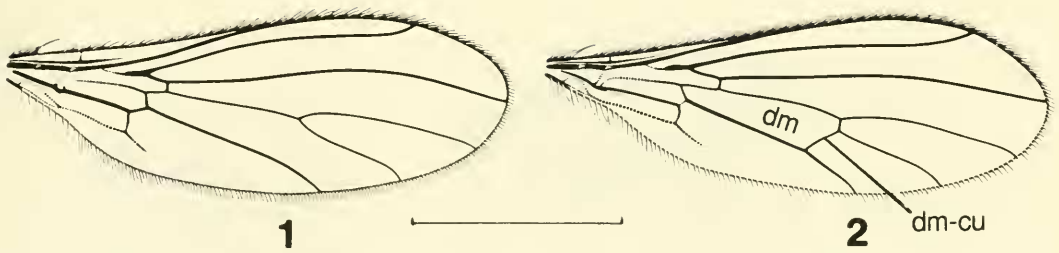
Phyllodromia americana Melander, 1947: 269.

Diagnosis.—Absence of crossvein dm-cu in both wings distinguishes adults of this species and those of *C. limitaria,* newly described below, from other species of *Chelipoda* treated here on which dm-cu very rarely is lacking in one wing. Examination of terminalia is required to separate males of *C. americana* and those of *C. limitaria.* The distinction between them is based on comparative structure of the subepandrial lobes and phallic processes. Males of *C. americana* possess phallic processes that are much shorter than the cerci and acutely inturned subepandrial lobes, the tips of which cross and each of which ends in three black projections. In comparison, males of *C. limitaria* possess phallic processes that are slightly longer than the cerci and lack black, distal projections on the subepandrial lobes, the tips of which do not cross.

Description.—Length including terminalia of male ca. 1.8 to 2.0 mm, of female ca. 1.8 to 2.1 mm. General color of male yellow, of female yellowish brown. Head black, except for yellow mouthparts and palps; bristles yellow. Antennal scape and pedicel yellow; flagellum and arista of male yellowish brown, of female brown. Thorax short, compact; bristles yellow. Legs yellow; distal tarsomere light brown. Fore femur ventrally with 2 rows of black setulae, each row flanked by row of 4–5 yellow bristles (see Fig. 5). Fore coxa lacking prominent basolateral seta, but row of fine setae continuing distally (see Fig. 6). Wing hyaline; crossvein dm-cu lacking; cell dm open (Fig. 1). Abdominal terga of male greyish brown, of female reddish brown; sterna paler than terga in both sexes. Male terminalia (Fig. 3) yellow, compact; hypandrium and epandrium only partially fused medially; cercus and epandrial lobe completely fused; cercus slender distally, ending in 3 strong setulae; subepandrial lobe curved acutely inward with tip crossing mid-line in dorsal view, ending in 3 pointed, black processes of uneven size; phallic process pointed apically, ca. 2× length of phallus and ca. ½ length of cercus. Female cercus short (see Fig. 10); spermatheca more or less reniform, with spermathecal duct arising from center of concave surface.

Type material examined.—HOLOTYPE

[b] Females are difficult to identify, with side by side comparison necessary: those of *C. sicaria* possess a brown antennal arista that contrasts with the pale pedicel and brown thoracic setae; those of *C. praestans* possess a tan antennal arista that does not contrast with the pale pedicel and tan thoracic setae.



Figs. 1, 2. 1, *Chelipoda americana* wing. 2, *Chelipoda contracta* wing. dm = cell; dm-cu = crossvein. Scale bar = 1.0 mm.

male, labelled "Mt. Monadnak/ 26 Jul '26 NH/ A L Melander" (USNM). The specimen is in excellent condition, at least some of the diagnostic features of the terminalia are visible without maceration, and the corrected type locality is Mt. Monadnock, New Hampshire. ALLOTYPE. Virginia: Great Falls, June (lacking head) (USNM). PARATYPES. Georgia: 1 female, Burton, May; 1 female, Decatur Co., Jun (USNM). New York: 2 females, 1 male, Millwood, Jun (USNM). Rhode Island: 1 female, Westerly, Jul (USNM). Virginia: 1 specimen (lacking abdomen), Great Falls, Jun (USNM).

Other specimens examined.—CANADA. Ontario: 1 female, 3 km E. Carp, Jul (CNC). UNITED STATES. Georgia: 1 female, Waycross, Mar (CNC). Florida: 1 female, Alachua Co., Apr (USNM). Maryland: 2 males, Bethesda, Jun (USNM). Massachusetts: 1 male, Nonomesset, Jul (USNM). New Hampshire: 1 female, Mt. Madison, Dolly Copp cmpgr., Jul (CNC). New York: 1 male, St. Lawrence Co., Jun (USNM). North Carolina: 1 male, Highlands, May (CNC).

Distribution.—Adult males of this species are known from eastern New York state, New Hampshire, southeastern Maryland, and the mountains of western North Carolina (Fig. 16).

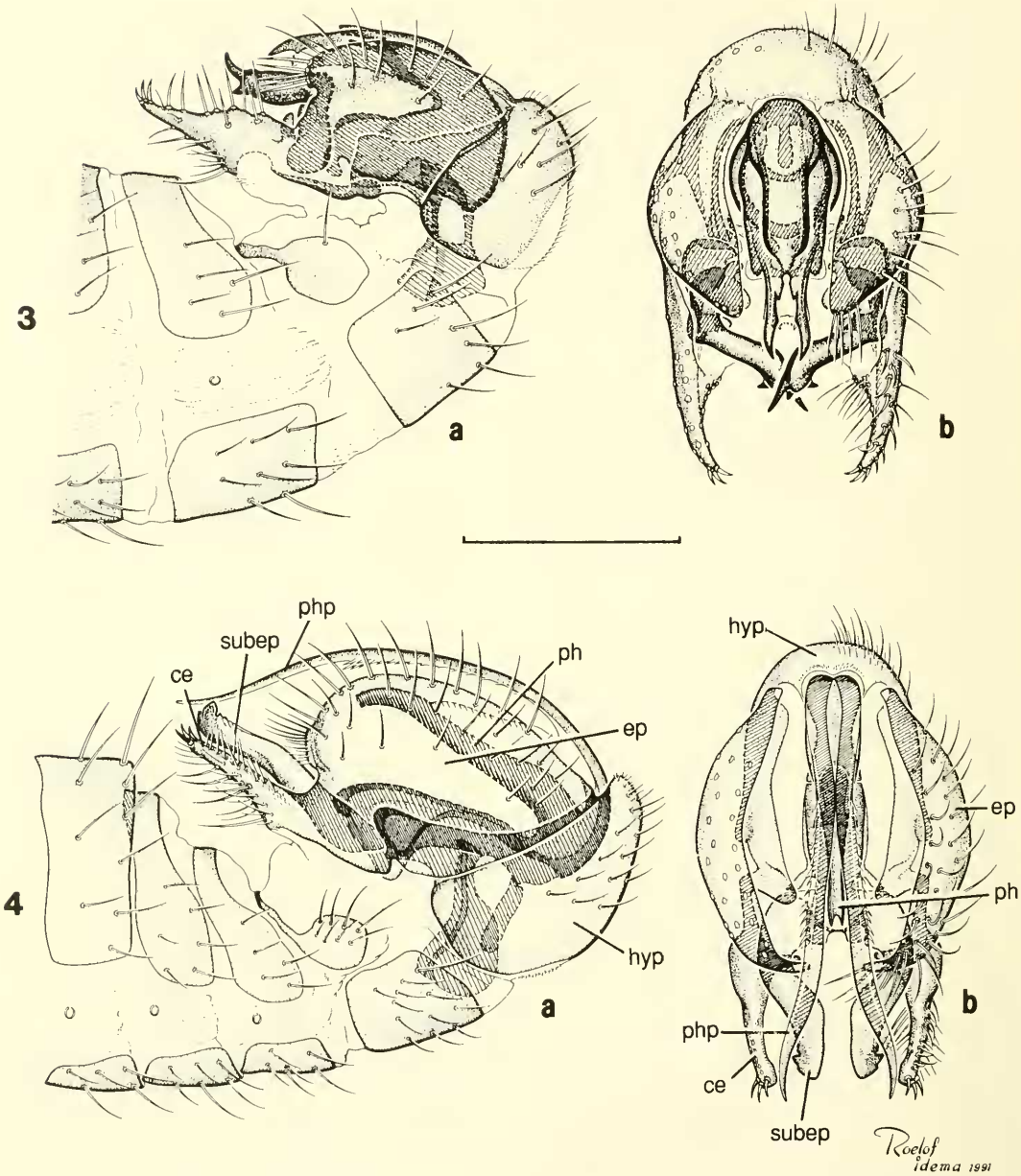
Remarks.—Some of the female paratypes and other females of *C. americana* recorded from the southeastern United States (Fig. 16) probably are females of *C. limitaria.* As mentioned in the identification key, reliable characters for separating females of *C. americana* and *C. limitaria* were not found (therefore the qualification pertaining to distribution records). However, female specimens from the northeastern United States and southeastern Canada, which probably are *C. americana,* are slightly smaller and possess a paler antennal arista than females in the type series of *C. limitaria.*

Chelipoda contracta Melander
(Figs. 2, 5, 7, 9, and 10)

Chelipoda contracta Melander, 1947: 265.

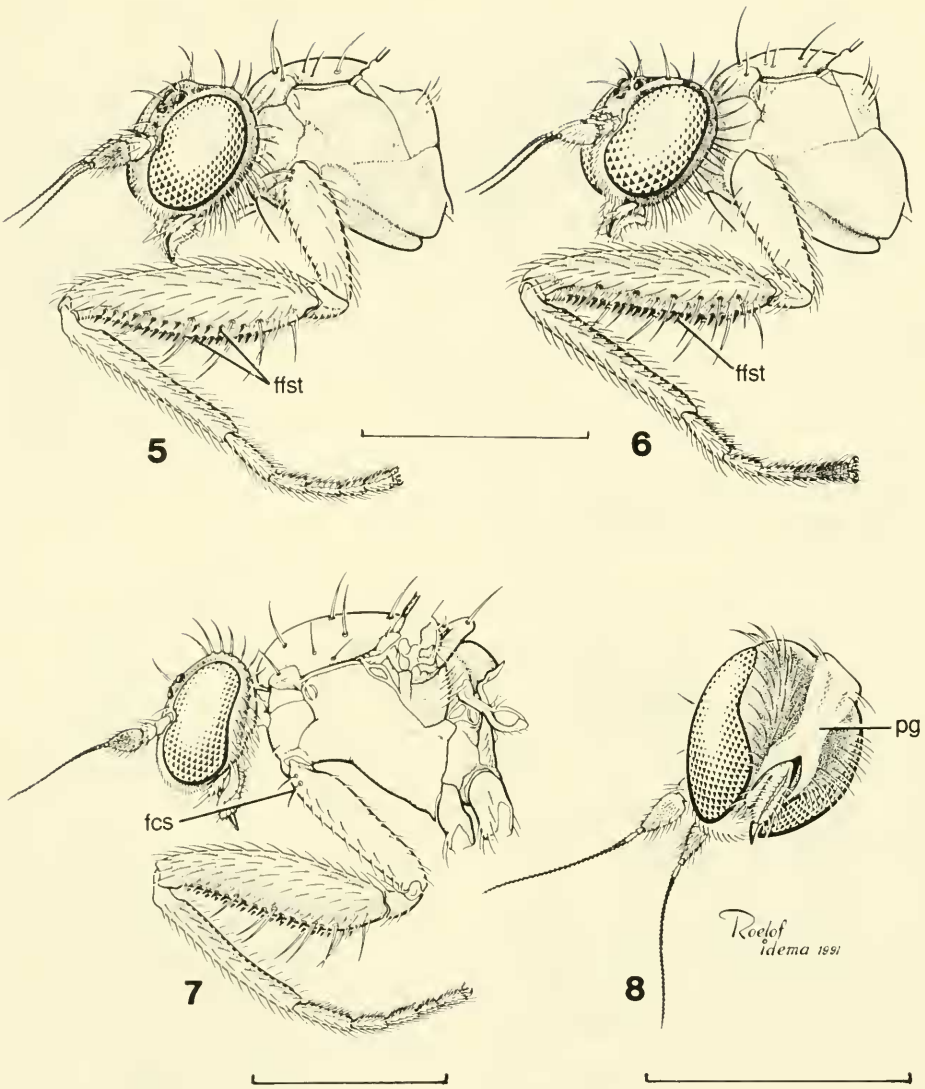
Diagnosis.—Adults are distinguished from those of other species treated here by the combination of two ventral rows of black setulae on the fore femur and at least one prominent seta (sometimes two) basolaterally on the fore coxa. The basolateral seta on the fore coxa usually is prominent, but often is less obvious on males, and occasionally is dislodged from one or both legs. Males are recognized by their delicate yellow bodies and small, compact terminalia. The relatively short, compact thorax of both sexes and the short cercus of females aid in separating adults of *C. contracta* from those of *C. elongata* and *C. truncata,* which also possess two complete rows of black setulae ventrally on the fore femur.

Description.—Length including terminalia of male ca. 1.6–1.8 mm, of female ca. 1.8 to 2.1 mm. General color of males yellow, of females usually yellowish brown.



Figs. 3, 4. 3a (lateral) and b (dorsal), *Chelipoda americana* male terminalia. 4a (lateral) and b (dorsal), *Chelipoda limitaria* male terminalia. ce = cercus; hyp = hypandrium; ph = phallus; php = phallic process; ep = epandrium; subep = subepandrial lobe. Scale bar = 0.25 mm.

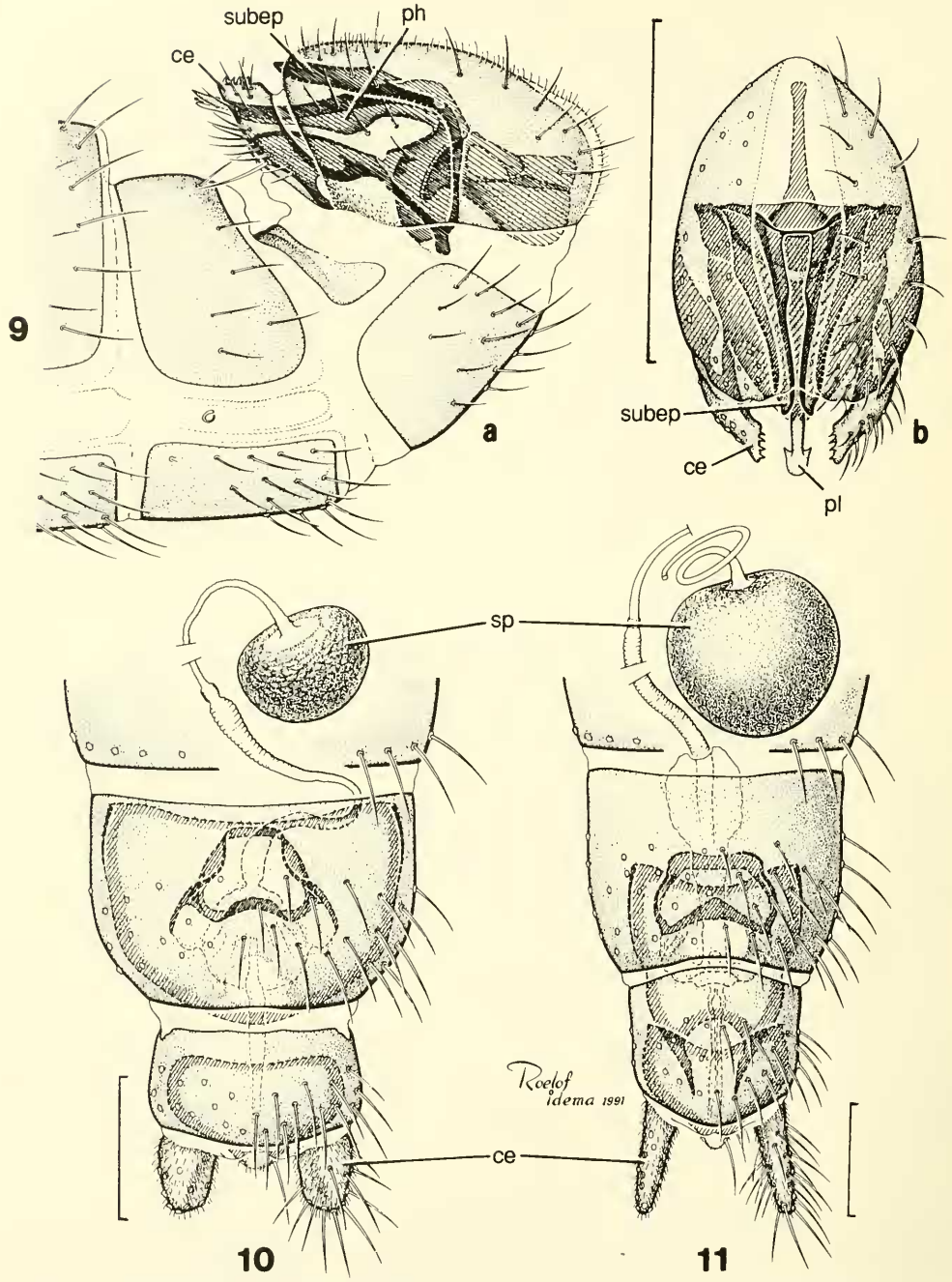
Head black, except for grey frons and postgena; mouthparts and palps yellow; bristles yellow. Antennal scape and pedicel yellow; flagellum and arista light brown to brown. Thorax short, compact; yellow to yellowish brown; bristles yellow. Legs yellow; fore femur ventrally with 2 rows of black setulae, each flanked by row of 4–5 light brown bristles (Fig. 5); fore coxa with a prominent basolateral seta (Fig. 7), weaker and less



Figs. 5–8. 5, *Chelipoda contracta* fore femur. 6, *Chelipoda praestans* fore femur. 7, *Chelipoda contracta* fore coxa. 8, *Chelipoda truncata* mid-ventral view of postgena. fcs = basolateral seta of fore coxa; ffst = setulae of fore femur; pg = postgena. Scale bars = 0.5 mm.

prominent on male. Wing hyaline; cross-vein dm-cu present; cell dm closed (Fig. 2). Abdominal terga yellowish brown, sterna light brown. Male terminalia (Fig. 9) yellow; compact, subequal to pre-genital segment; cercus and phallus projecting anteriorly only slightly beyond the completely fused hypandrium and epandrium; cercus separate from epandrial lobe, nearly rectangular in lateral view; subepandrial lobe sword-shaped, ca. ¾ length of phallus; phallus strongly expanded at apex in dorsal view, subequal in length to cercus; phallic processes lacking. Female cercus short; spermatheca hemispherical, with spermathecal duct arising from center of flat surface (Fig. 10).

Type material examined.—HOLOTYPE



Figs. 9–11. 9a (lateral) and b (dorsal), *Chelipoda contracta* male terminalia. 10, *Chelipoda contracta* female terminalia. 11, *Chelipoda elongata* female terminalia. ce = cercus; ph = phallus; sp = spermatheca; subep = subepandrial lobe. Scale bars = 0.25 mm (Fig. 9a, b) and 0.1 mm (Figs. 10, 11).

male, labelled "Petersham/ MASS 9 vi '32/ A L Melander" (USNM). The specimen is in excellent condition and at least some of the diagnostic features of the terminalia are visible without maceration. A female labelled "ALLOTYPE *C. contracta*" with the same collecting data as the holotype was *C. praestans*. PARATYPES. CANADA. British Columbia: 1 female, Abbotsford, Aug (USNM); 3 females (CU) and 1 female (USNM), Downie Crk., Selkirk Mts., Aug. Ontario: 1 male, 4 females, Waubamich, Jun (USNM). UNITED STATES. Connecticut: 3 females, 5 males, Redding, May–Jun (USNM). Massachusetts: 1 female, 1 male, Boston, Jun; 1 female, 1 male, Petersham, Jul (USNM). Maine: 2 females, Seal Harbor, Jul (USNM). New Hampshire: 4 females, Breton Woods, Jul (USNM). New York: 4 females, 1 male, Ithaca, Jun; 1 female, 2 males, Tuxedo, May (USNM). Washington: 11 females, 12 males, Index, Aug; 2 females, Lake Cushman, Jul; 11 females, Mt. Baker, Skyline Trail, Aug; 4 males, Mt. Constitution, Jul; 1 male, Mt. Vernon, Jul; 1 female, Sultan, Aug (USNM).

Other specimens examined.—CANADA. Alberta: 1 female, Waterton Prk., Jul (CNC). British Columbia: 3 females, 1 male, Cultus Lk., Jun–Aug; 1 female Liard Hot Sprs., Jul; 36 females, 35 males, Terrace, Jun–Aug (CNC, CU, UKL, USNM). Manitoba: 1 female, Brandon, Jul; 1 female, 1 male, Forrest, Jul; 5 females, Ninette, Jul; 8 females, Turtle Mt., Jul–Aug (CNC). New Brunswick: 2 females, Acadia, Jun; 1 female, Chamcock, Jul (CNC). Newfoundland: 1 female, Bay of Islands, Jul; 7 males, 8 females, St. Johns, Aug (AMNH, CNC). Nova Scotia: 29 females, 46 males, Cape Breton Highlands Nat. Prk., Jun–Aug; 14 females, 2 males, Lockport, Jul–Aug; 1 female, Shelburne, Aug; 5 females, Springfield, Aug (CNC). Ontario: 1 male, Atikokan, Jul; 2 females, Ft. Francis, Jul; 1 male, 3 females, Griffith, Jun–Jul; 1 female, Kenora, Aug; 1 female, Mamora, Jul; 2 females, Maynooth, Jun; 2 females, 1 male, Midland, Jul–Aug; 1 male, One-Sided-Lake, Jun; 4 females, 4 males, Ottawa, Jun–Jul; 1 female, S. March, Jun; 2 females, Waubamich, Jun–Jul (CAS, CNC). Quebec: 1 female, Abbotsford, Jun; 1 female, 1 male, Beechgrove, Jun; 3 females, 2 males, Breckenridge, Jun; 1 female Cap Rouge, Jul; 1 female, Corey Hill, Jun; 17 females, 13 males, Old Chelsea; 2 females, Park Reserve, Jul; 1 female, Rivere-du-Loop, Jul; 26 females, 1 male, Wakefield, Jun–Jul (CNC, USNM). Saskatchewan: 1 female, 1 male, Rockglen, Jun; 2 females, 3 males, Scout Lk., Jun (CNC). UNITED STATES. Georgia: 6 females, 5 males, Athens, Apr–May; 1 female, Black Rock Mt., May; 2 females, Rabun Co., Aug (CNC, CU, MAC). Illinois: 1 female, Macomb, May (USNM). Maine: 2 females, Mt. Katahdin, Jul (CNC). Maryland: 1 female, 1 male, Bethesda, May–Jun (USNM). Massachusetts: 1 female, 1 male, Woods Hole, Aug (AMNH). Michigan: 1 male, Cadillac, Jun; 1 female, Crawford Co., Jun; 2 females, Isle Royale, Jul–Aug; 2 females, Manistee, Jul; 3 females, Midland, Jun–Jul; 1 male, Schoolcraft, Jun (CNC, USNM). Minnesota: 8 females, 2 males, Basswood Lk., Jul–Aug; 1 female, Eaglenest, Aug; 2 females, 2 males, Itaska St. Prk., Jun–Jul (AMNH, UMSP). Montana: 2 females, Flathead Lk., Aug (USNM). New Jersey: 1 female, Brookside, Sep (AMNH). New York: 1 female, Essex Co., Jul; 1 female, Orleans Co., Aug (CAS, CNC). North Carolina: 1 female, Coweeta, May; 2 females, 1 male, Highlands, May; 1 female, Looking Glass Pk., Jul; 1 female, Macon Co., Jul (CNC, UNH); 1 female, McDowell Co., Sep (USNM). Pennsylvania: 3 females, Spring Bridge, Jun (USNM). Tennessee: 4 males, Great Smoky Mts. Nat. Prk., E. Gatlinburg, Jun–Jul (USNM). Virginia: 1 female, Alexandria, Jun; 1 female, Big Meadow, Jun; 2 females, Blacksburg, May; 2 males, Brush Mt., May; 2 males, Falls Church, May; 5 females, 1 male, Hawksbill,

Jun (CNC, USNM). Washington: 4 females, 1 male, Friday Harbor, Jun–Jul (AMNH, CU, FSCA). Wisconsin: 1 female, Vilas Co., Jun (USNM).

Distribution.—This is the most widespread Nearctic species, occurring across southern Canada and the northern United States, and south into the Appalachian mountains of northern Georgia (Fig. 17).

Remarks.—Adults have been collected at sea level (Puget Sound, Washington) and near 1200 meters in the Appalachian Mountains. Specific habitats in the Appalachian Mountains include mesophytic hardwood, hemlock, and damp fir/spruce forests. Labelled specimens from Manitoba are from a Maple/Elm floodplain, "around a *Populus balsamifera* L. (balsam popular) slough," "in secondary growth vegetation associated with power lines," and a dead cat. Specimens also have been taken off blossoms of *Vaccinium* sp. in Virginia and in "wet, scrubby clearings" near Terrace, British Columbia. Several series consisting of males and females were collected in Malaise traps and yellow pan traps in Cape Breton Highlands National Park, Nova Scotia, by J. R. Vockeroth (Biological Resources Division, Agriculture Canada, Ottawa).

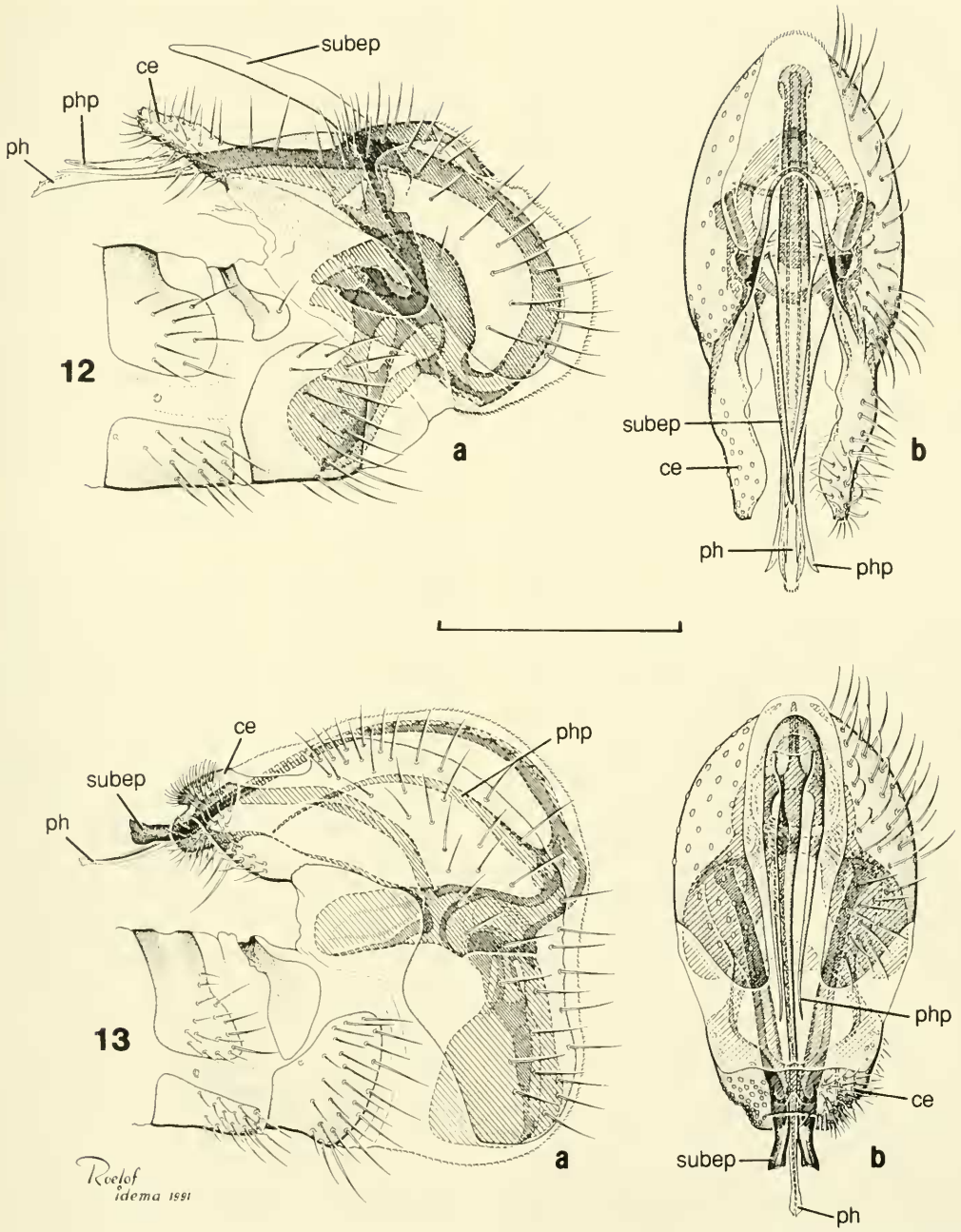
Chelipoda elongata (Melander)
(Figs. 11, 12)

Litanomyia elongata Melander, 1902: 232.
Chelipoda elongata; Melander, 1928: 266.
Chelipoda albiseta (Zetterstedt) *sensu* Melander, 1947: 265 (misident.)

Diagnosis.—Adults of this species, similar to those of *C. contracta,* possess two ventral rows of black setulae on the fore femur, but they are distinguished by the elongated thorax, lack of a prominent basolateral seta on the fore coxa, and a long female cercus. The contrastingly darker distal tarsomere and concolorous postgena, gena and occiput distinguish adults of *C. elongata* from those of *C. truncata,* newly described below. Male terminalia resemble those of *C. truncata,* but differ in possessing pointed subepandrial lobes and phallic processes that are subequal in length to the phallus; males of *C. truncata* have truncate subepandrial lobes and much shorter phallic processes, which are about half the length of the phallus.

Description.—Length including terminalia of male ca. 2.0–2.5 mm, of female ca. 2.5–2.8 mm. General color yellow to yellowish or light reddish brown. Head black, including postgena; mouthparts and palps yellow to light reddish brown; bristles brown. Antennal scape and pedicel yellow; flagellum brownish black; arista brownish black on basal tenth, distally brownish to nearly white in some specimens. Thorax long, slender; yellow to yellowish brown; bristles brown. Legs yellow, except coxa and distal tarsomere light brown. Fore femur ventrally with 2 rows of black setulae, each flanked by row of 4–5 light brown bristles (see Fig. 5). Fore coxa lacking prominent basolateral seta, but row of fine setae continuing distally (see Fig. 6). Wing hyaline; crossvein dm-cu present; cell dm closed (see Fig. 2). Abdominal terga brown, sterna light brown. Male terminalia (Fig. 12) yellow, projecting anteriorly to abdominal segment 6; hypandrium and epandrium completely fused; cercus fused to epandrial lobe, nearly straight, subequal in length to subepandrial lobe; subepandrial lobe slender, slightly curved ventrally and pointed apically; phallus and phallic process nearly straight, subequal in length, extending anteriorly beyond cercus and subepandrial lobe. Female cercus long; spermatheca nearly oval, with spermathecal duct arising from the center of a somewhat flattened pole (Fig. 11).

Type material examined.—LECTOTYPE (here designated from Melander's cotype series number 29182), male labelled "Brookings/ SD" (USNM). The lectotype lacks the head and most of the right front leg, but most of the diagnostic features of terminalia are visible without maceration. The paralectotype series includes a *C. elon-*



Figs. 12, 13. 12a (lateral) and b (dorsal), *Chelipoda elongata* male terminalia. 13a (lateral) and b (dorsal), *Chelipoda truncata* male terminalia. ce = cercus; ph = phallus; subep = subepandrial lobe. Scale bar = 0.25 mm.

gata female with a "Mass" label, a *C. praestans* female with a "Mass" label, and a badly damaged *Chelipoda* specimen with a "Mass" label.

Other specimens examined.—CANADA. Manitoba: 7 females, 4 males, Ninette, Jul; 3 males, Turtle Mt., Jul (CNC). Ontario: 1 male, Ft. Credit, Aug; 1 male, Ft.

Frances, Jul; 21 females, 6 males, Grand Bend, Jul; 2 females, Griffith, Jul; 1 female, Kearny, Jul; 3 females, 6 males, Ottawa, Jul (CNC, USNM). Quebec: 2 males, Wakefield, Jul; 4 females, 1 male, Hull, Aug (CNC). UNITED STATES. Florida: 1 male, Alachua Co., Apr; 1 female, 3 males, Elfers, Apr; 1 male, 1 female, Everglades Nat. Prk., Apr; 1 male, Gainesville, Feb; 4 females, 2 males, Hialeah, Mar; 1 female, Homestead, Apr; 1 female, Jacksonville, Nov; 1 female, Putnam Co., May; 2 females, Royal Palm, Jan; 1 female, Sebring, Jun; 1 male, St. Petersburg, Mar; 1 male, Tarpon Sprs., Apr; 2 males, 5 females, Vero Beach, Apr (AMNH, CNC, UNH, USNM). Georgia: 3 females, Black Rock Mt., May; 1 female, Clayton, Aug; 6 females, 6 males, McIntosh Co., Sapelo I., Apr; 1 female, 1 male, Rabun Co., Jul (CNC, USNM). Indiana: 1 female, 1 male, Lafayette, Jun (USNM). Maryland: 1 male, Glen Echo, May; 1 male, Ft. Washington, May (USNM), Massachusetts: 1 female, Athol, Jul; 1 female, 1 male, Woods Hole, Aug (AMNH, USNM). Michigan: 1 female, Ann Arbor, Sep; 1 female, Bath, Jun; 1 female, Branch Co., May; 1 female, Cheboygan Co., Aug; 2 females, Clinton Co., Jun; 1 female, Detroit, Jun; 1 female, Isle Royale, Aug; 1 female, Manistee, Jul; 3 males, Midland Co., Jun; 1 female, Nottawa, Jun; 1 female, Traverse Co., 1 female, Wayne Co., Jul (CNC, UKL, USNM). Minnesota: 3 females, Basswood Lk., Jul; 1 male, Cass Co., Jul; 2 males, Itaska, Jul; 1 female, White Bear, Jul (UMSP). New Hampshire: 1 male, Dixville, Jul; 1 male, 1 female, White Mts., Stinson Lk., Jul (UNHC, USNM). New Jersey: 1 female, Brookside, Sep (AMNH). New York: 1 male, Canajoharie, Jul; 1 male, 1 female, Ithaca, Jul; 1 female Lk. Sebogan, Aug; 1 female, Ludlowville, Jul; 1 male, Peekskill, Jul; 1 female, Rome, Jun; 1 female, Oneotona, Aug; 1 male, Shokan, Jul; 1 female Thomkins Co., Aug (CNC, CUIC, USNM). North Carolina: 1 male, Bubbling Spr. Crk., Jul; 7 females, 3 males, Highlands, Jun–Jul; 8 females, 2 males, Looking Glass Rock, Jul; 4 males, 8 females, Nags Head, May; 1 female, Wayah Gap, Macon Co., Jul (CNC, USNM). Rhode Island: 1 female, 2 males, Westerly, Jul (USNM). South Carolina: 1 male, Mt. Rest, Oconee Co., Jul (CNC). South Dakota: 2 males, Pierre, Jul (UMSP). Tennessee: 5 females, 2 males, Gatlingburg, Jun–Jul (USNM). Virginia: 2 males, Richmond Co., Jul (USNM). Wisconsin: 1 female, 1 male, Vilas Co., Jul (UWM).

Distribution.—This species is widely distributed in eastern North America, occurring from extreme southern Manitoba and the northern Great Plains of the United States east to the Atlantic coast and south into southern Florida (Fig. 18).

Remarks.—Owing to the nearly white arista on many specimens, *C. elongata* probably was the species considered to be *Chelipoda albiseta,* a Palearctic species included in earlier state lists of insects. Melander (1947) expressed doubt that females, with a "strikenly white arista" were *C. albiseta,* suggesting instead that "when the male with a white arista is discovered a new name probably will be required." My examination revealed that variation exists in arista coloration of males of *C. elongata,* and perception of whiteness or darkness of a given arista is influenced by the incidence of light as specimens are rotated under the microscope.

Specimens of *C. elongata* have been collected from *Betula glandulosa* Michx. (tundra dwarf birch) in Manitoba, during sweeping of foliage of *Quercus laevis* Walt. (Turkey oak) in Florida, and in light traps.

Chelipoda limitaria MacDonald, New Species
(Fig. 4)

Diagnosis.—Absence of crossvein dm-cu in both wings distinguishes adults of this species and *C. americana* from those of other *Chelipoda* treated here. The distinction between *C. limitaria* and *C. americana* is based on comparative structure of male

genitalia, as presented in the diagnosis section pertaining to *C. americana,* with males of *C. limitaria* possessing phallic processes that are longer than the cerci and lacking black, distal projections on the subepandrial lobes, the tips of which do not cross.

Description.—MALE: Body length including terminalia ca. 1.8 mm. General color yellow to yellowish brown. *Head:* black, except for yellow mouthparts and palps; bristles yellow. Antennal scape and pedicel yellow; flagellum and arista brown. *Thorax:* short, compact; bristles yellow; scutum yellowish brown, darker brown along notopleural suture and at apex; scutellum and postnotum brown. *Legs:* yellow, except distal tarsomere light brown. Fore femur ventrally with 2 rows of black setulae, each flanked by row of 4–5 yellow bristles (see Fig. 5). Fore coxa lacking prominent basolateral seta, but with row of setae continuing distally (see Fig. 6). *Wing:* hyaline; crossvein dm-cu absent; cell dm open (see Fig. 1). *Abdomen:* terga greyish brown; sterna paler brown. Terminalia (Fig. 4) yellow, compact; hypandrium and epandrium almost completely separate; cercus fused to epandrial lobe, subequal in length to subepandrial lobe, slender and ending in 3 strong setulae; subepandrial lobe horseshoe-shaped in dorsal view; phallus ca. ⅔ length of phallic process, not extending past epandrial lobe in lateral view; phallic process slender, pointed apically, and extending slightly past cercus and subepandrial lobe. FEMALE: length including terminalia ca. 2.1–2.4 mm; general body color darker than male, thorax yellowish brown, darker brown along notopleural suture, with dark brown median stripe on scutum; abdominal terga 1–6 light brown, terga 7–8 yellowish; cercus short (see Fig. 10); spermatheca more or less reniform, with spermathecal duct arising from center of concave surface.

Type material.—HOLOTYPE male, labelled "GA: McIntosh Co./Sapelo Island/ 28. IV.–9. V, 1987: MT/Live Oak Forest/ BRC HYM. TEAM" (CNC, holotype no. 21333). The specimen is in excellent condition and at least some of the diagnostic features of terminalia are visible without maceration. ALLOTYPE labelled "GA: McIntosh Co./ Sapelo Island/28.IV, 1987: MT/Live Oak Forest/BRC. HYM. TEAM," deposited in CNC. PARATYPES. Georgia: 43 females, same collection site as holotype (CNC). North Carolina: 1 male, Fort Bragg, May–Jun (CAS). Texas: 1 male (macerated terminalia in glycerin microvial), 12 females, Montgomery Co., Jones St. For., 8 mi S. Conroe, Apr (CNC).

Distribution.—Males of this species are known only from the coastal plain of southeastern Texas and Georgia, and the inland coastal plain of North Carolina (Fig. 16).

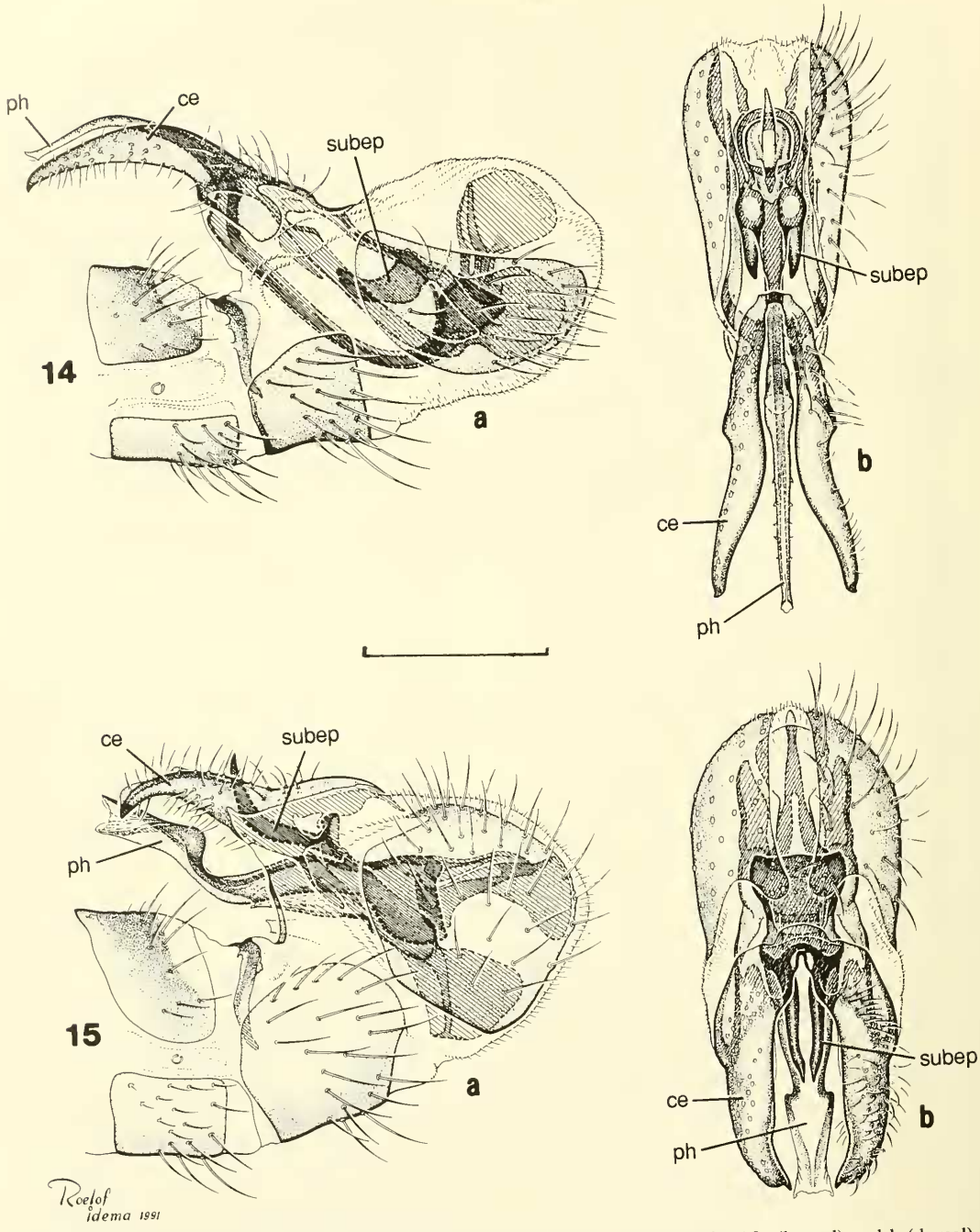
Etymology.—The specific epithet is in reference to the apparent limited distribution of this species.

Remarks.—The existence of this new species was brought to my attention by Ralph Idema and Brad Sinclair (Biological Resources Division, Ottawa) after their examination of macerated terminalia of specimens labelled "*americana*" that had been dissected in preparation of the figures for this paper. The holotype and nearly all the paratypes in the type series were taken in Malaise traps set up in a live oak forest by members of the "Hymenoptera team" at the Biological Resources Centre, Agriculture Canada.

Chelipoda praestans Melander
(Figs. 6, 14)

Chelipoda praestans Melander, 1947: 267.

Diagnosis.—Adults resemble those of *C. contracta* in size and coloration, but possess only one ventral row of black setulae on the fore femur and the female cerci are long. Males superficially resemble those of *C. sicaria,* particularly when the anterior portions of the terminalia of the latter project ventrally into the pregenital abdominal segments and are not clearly visible. Macerated terminalia of these two species are distinc-



Figs. 14, 15. 14a (lateral) and b (dorsal), *Chelipoda praestans* male terminalia. 15a (lateral) and b (dorsal), *Chelipoda sicaria* male terminalia. ce = cercus; ph = phallus; subep = subepandrial lobe. Scale bar = 0.25 mm.

tive, however. Those of *C. praestans* possess a uniformly slender phallus in dorsal view and very small subepandrial lobes, whereas those of *C. sicaria* possess a phallus that is distinctly expanded apically and prominent subepandrial lobes that are at least half the length of the phallus. In areas of sympatry, identification of females of these two species is difficult and must be based on close comparison, with the much paler antennal arista and paler thoracic setae being the most reliable characters for distinguishing females of *C. praestans* from those of *C. sicaria.*

Description.—Length including terminalia of male ca. 2.0–2.4 mm, of female ca. 1.8–2.4 mm. General body color yellow to yellowish grey. Head black, except for yellowish grey gena and postgena; mouthparts and palps yellow; bristles light brown. Antennal scape and pedicel yellow; flagellum yellowish brown; arista light brown. Thorax short, compact; yellowish grey, paler ventrally; bristles light brown. Legs yellow. Fore femur ventrally with an inner row of 16–20 black setulae and incomplete outer row of ca. 6–10 weaker black setulae, each such row flanked by row of 5–6 light brown bristles (Fig. 6). Fore coxa with 1 or 2 prominent basolateral setae and row of weaker setae continuing distally (see Fig. 7). Wing hyaline; crossvein dm-cu present; cell dm closed (see Fig. 2). Abdominal terga yellowish grey, sterna yellow. Male terminalia (Fig. 14) yellow, projecting anteriorly nearly to abdominal segment 5; hypandrium and epandrium completely fused; cercus and epandrial lobe separate; cercus slender, curved ventrally distally, subequal in length to phallus; subepandrial lobe ca. $\frac{1}{10}$ length of phallus; phallus slender, strongly curved ventrally over distal $\frac{1}{3}$ in lateral view; phallic processes lacking. Female cercus long (see Fig. 11); spermatheca hemispherical, with spermathecal duct arising from center of flat surface (see Fig. 10).

Type material examined.—HOLOTYPE male, labelled "Redding CT/ 10 June '29/ A L Melander" (USNM). The specimen is in excellent condition and most of the diagnostic features of the terminalia are visible without maceration. Two females on the pin with the holotype and labelled "*C. praestans* ALLOTYPES" were females of *C. contracta*. PARATYPES. CANADA. Ontario: 1 male (lacking head), Waubamick, Jul (USNM). UNITED STATES. Connecticut: 7 females, 6 males (1 pin also includes a *C. contracta* male and another pin also includes 2 *C. contracta* females), Redding, May–Jun (USNM). Massachusetts: 9 females, 1 male (one female labelled "allotype *Chelipoda contracta*"), Petersham, Jul (USNM). Maine: 1 female, Seal Harbor, Jul (USNM). New Hampshire: 1 female, Mt. Monadnock, Jul; 2 females, Mt. Washington, Jul; 1 female, Pinkham Notch, Jul (USNM). New York: 1 female, 2 males, Bear Mt., Jul (USNM). Pennsylvania: 1 female, Chester Co. (USNM).

Other specimens examined.—CANADA. Newfoundland: 2 females, 1 male, St. Johns, Jul (CNC). Nova Scotia: 2 females, 6 males, Cape Breton Highlands Nat. Prk., Jul; 5 females, 4 males, Cranberry I., Jul; 1 female, 11 males, Lockeport, Jul–Aug; 2 females, 6 males, Lone Shieling, Jun–Jul; 1 female, 1 male, Springfield, Jun–Aug; 2 males, 12 females, St. Anne De Ruisseau, Jul (CNC, USNM). Ontario: 3 females, 1 male, Iroquois Falls, Jun (CNC). Quebec: 1 female, Beechgrove, Jun; 1 male, Old Chelsea, Jun (CNC). UNITED STATES. Georgia: 2 males, Rabun Bald, Jul–Aug (CNC). Maine: 12 females, 14 males, Seal Harbor, Mt. Desert I., Jul (CNC). New Hampshire: 4 males, 2 females, Wonalancet, Jul (UNH). New York: 6 females, 8 males, Lake Placid, Jul (CNC). North Carolina: 1 female, Devils Court House, Aug; 36 females, 13 males, Highlands, May–Aug; 1 female, Lake Taxaway, Jul; 1 female, 1 male, Yancey Co., Mt. Mitchell, Jun; 2 females, 1 male, Wayah Gap, Jul (CNC, UKL). Pennsylvania: 1 female, Spring Bridge, Jun; female/male *in*

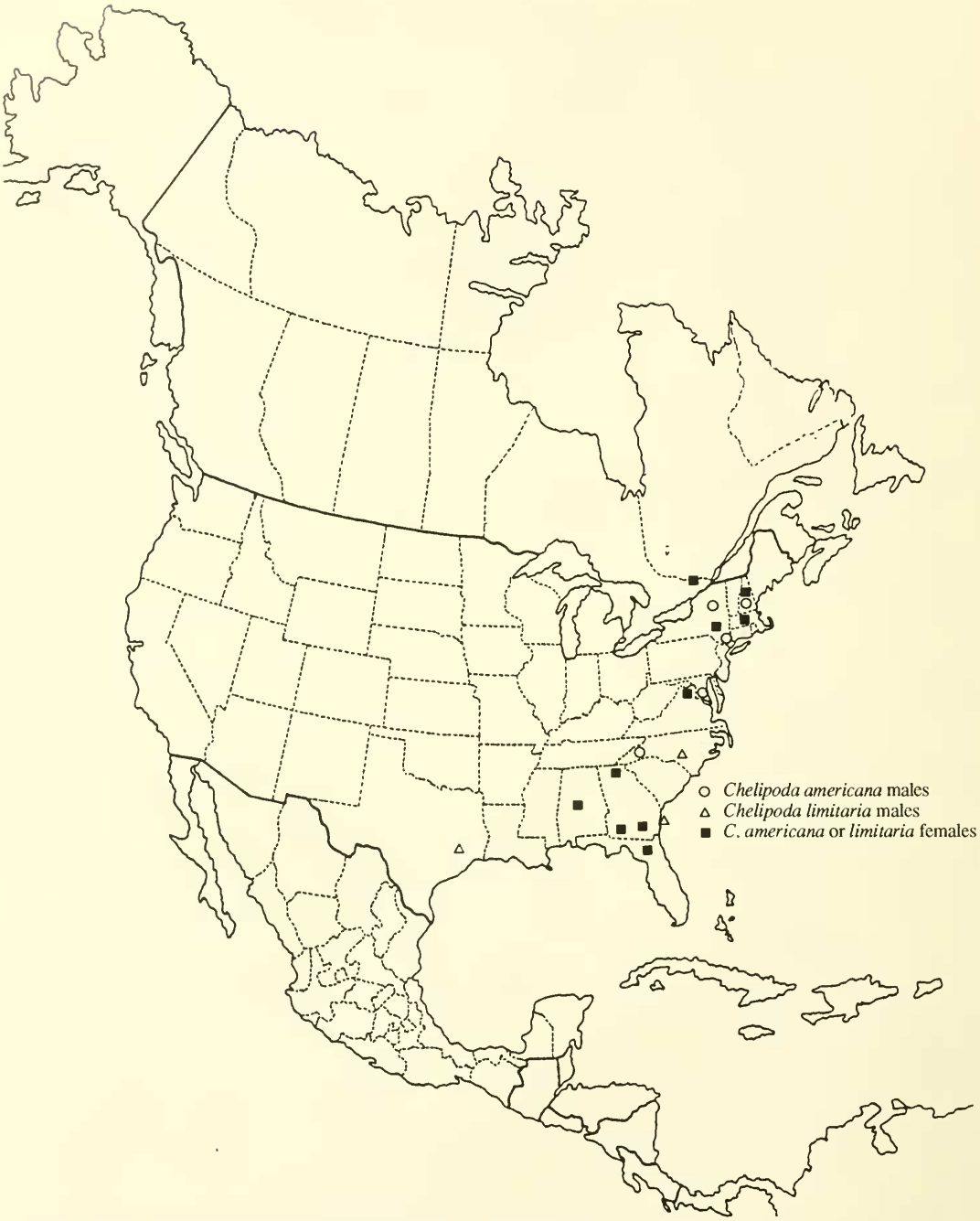


Fig. 16. Distribution of *Chelipoda americana* and *Chelipoda limitaria.*

copula, Luzerne Co., Bicketts Glen Prk., Jul (UKL). Tennessee: 1 female, Clingman's Dome (CNC); 1 male, Great Smoky Mts. Nat. Prk., Beech Gap, Jul (USNM). Virginia: 1 female, Giles Co., Mt. Lake Biol. Sta., Jun; 1 female, 3 males, Hawksville, Jun (CNC).

Distribution.—This species occurs from

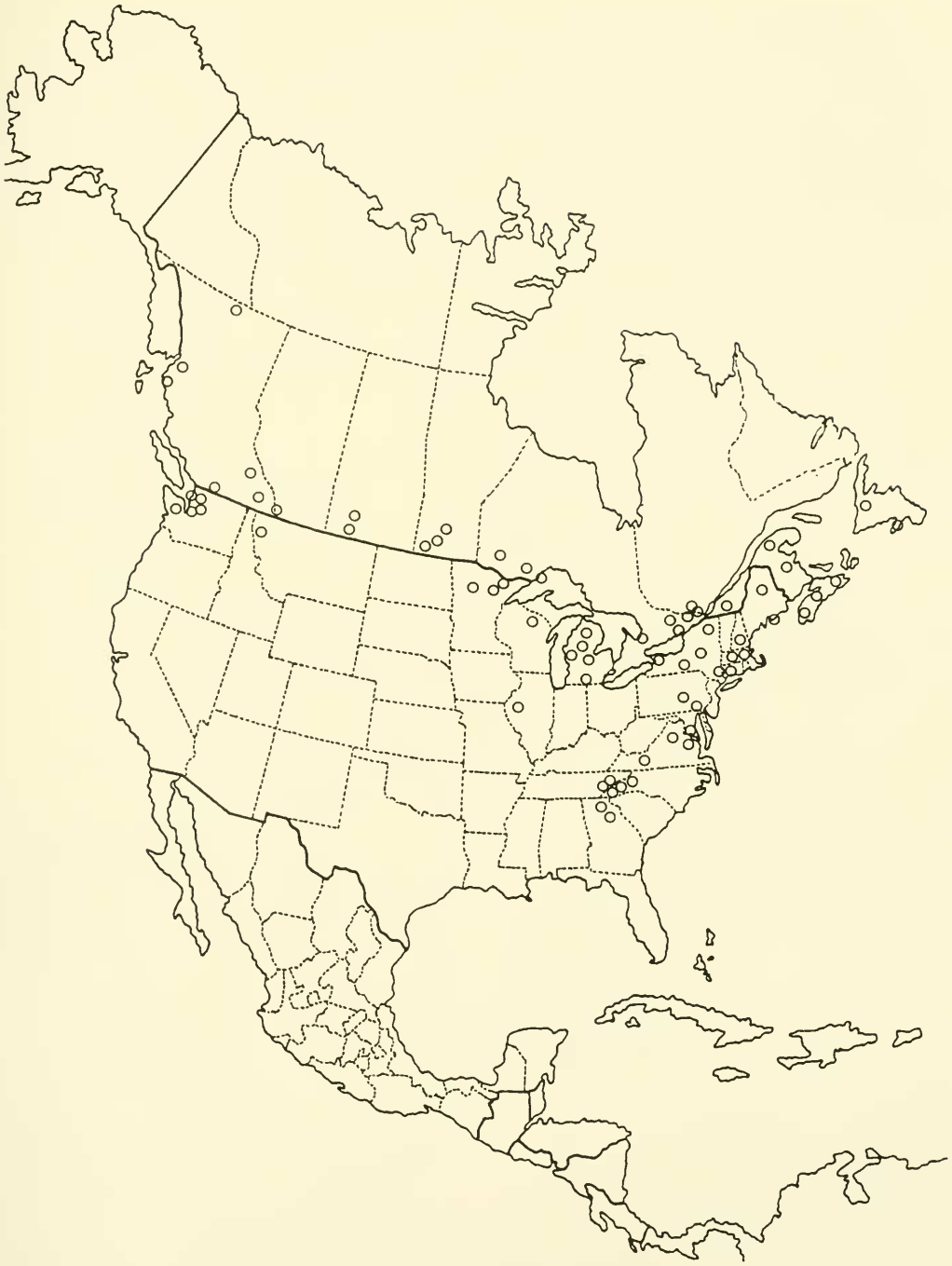


Fig. 17. Distribution of *Chelipoda contracta*.

Fig. 18. Distribution of *Chelipoda elongata* and *Chelipoda truncata*.

Fig. 19. Distribution of *Chelipoda praestans* and *Chelipoda sicaria*.

southeastern and extreme eastern Canada, south along the Appalachian Mountains into northern Georgia (Fig. 19).

Remarks.—Specimens of this species have been taken from flowers of *Castenea pumila* (L.) Mill. (eastern chinquapin) in Great Smoky Mountains National Park and from aphid-infested *Veratrum* sp. near Lake Placid, New York, but no prey records exist.

Chelipoda sicaria Melander
(Fig. 15)

Chelipoda sicaria Melander, 1947: 268.

Diagnosis.—Males and females of *C. sicaria* closely resemble those of *C. praestans.* Adults of both species possess only one complete row of black setulae ventrally on the fore femur and the female cerci are relatively long. Identification of males is based on terminalia differences, but females are difficult to place; discussion of the characteristics employed is presented in the diagnosis section pertaining to *C. praestans.*

Description.—Length including terminalia of male ca. 2.0–2.4 mm, of female ca. 2.4–2.8 mm. General body color yellow to dark reddish brown. Head brownish black to reddish black; mouthparts and palps light reddish black; bristles dark brown. Antennal scape and pedicel yellow; flagellum yellowish brown; arista dark brown. Thorax short, compact; yellow to dark reddish brown; bristles dark brown. Legs yellow to light brownish black. Fore femur ventrally with an inner row of 16–20 black setulae and an incomplete outer row of ca. 6–10 weaker black setulae, each such row flanked by row of 5–6 light brown bristles (see Fig. 6). Fore coxa with 1 or 2 prominent basolateral setae and row of weaker setae continuing distally (see Fig. 7). Wing hyaline; crossvein dm-cu present; cell dm closed (see Fig. 2). Abdominal terga brownish to brownish black, sterna light brown to light brownish black. Male terminalia (Fig. 15) yellowish brown to brownish black, projecting anteriorly to abdominal segment 7 or projecting ventrally into pre-genital abdominal segments; hypandrium and epandrium completely fused; cercus and epandrial lobe separate; cercus curved ventrally at apex, subequal in length to phallus; pointed subepandrial lobe upturned in lateral view, ca. ½ length cercus; phallus sinuate in lateral view, prominently expanded laterally at distal ⅓ in dorsal view; phallic processes lacking. Females paler than concurrently collected males; cercus slightly longer than width at base; spermatheca hemispherical, with spermathecal duct arising from center of flat surface (see Fig. 10).

Type material examined.—HOLOTYPE male, labelled "Gt. Smokie NP/Newfnd Ridge/ 11 July '41/A L Melander" (USNM). The specimen is in excellent condition and most of the diagnostic features of the terminalia are visible without maceration; the elaborated type locality is Great Smoky Mountains National Park, Newfound Ridge, along the border of Tennessee and North Carolina. ALLOTYPE, same data as holotype (USNM). PARATYPES. North Carolina: 1 male (lacking head), Great Smoky Mts. Nat. Prk., Andrews Bald, Jul; 1 female, 1 male (lacking head), Great Smoky Mts. Nat. Prk., Newfound Gap, July (USNM).

Other specimens examined.—UNITED STATES. North Carolina: 14 males, 17 females, Great Smoky Mts. Nat. Prk., Balsam Mt., Jun (PERC); 6 males, 9 females, Great Smoky Mts. Nat. Prk., Clingman's Dome (CNC). North Carolina–Tennessee border: 6 males, 8 females, Great Smoky Mts. Nat. Prk., 1 mi S. Newfound Gap, Jun (USNM); 3 males, Great Smoky Mts. Nat. Prk., Newfound Ridge, Jul (USNM). Tennessee: 12 males, 9 females, Great Smoky Mts. Nat. Prk., Gatlinburg, Jun–Jul (USNM).

Distribution.—This species is known only from the higher elevations of Great Smoky Mountains National Park (Fig. 19).

Remarks.—Adults of this species vary greatly in coloration, from nearly concolorous yellow (most specimens in collections) to nearly concolorous dark reddish

brown, with males darker in coloration than concurrently collected females. Examination of macerated males representing the range of coloration revealed identical terminalia. Included in the examination were two series collected 33 years apart from near Clingman's Dome, Great Smoky Mountains National Park: males in one series collected June 18, 1957 were dark reddish-brown; males in another series collected June 15, 1990 were yellow to yellowish brown.

Specimens in the June 15, 1990 series, mentioned above, were swept off foliage in late afternoon, in dense, fern undergrowth along a small stream under dense hardwood canopy. Another series, taken June 13, 1990, below Balsam Mt. campground were swept off emergent vegetation in a seepage area along Flat Creek under a hardwood canopy, again in late afternoon.

Chelipoda truncata MacDonald, New Species
(Figs. 8, 13)

Diagnosis.—Adults closely resemble those of *C. elongata,* but differ in having entirely yellow tarsi and in possessing a distinct pale area (usually golden yellow) on the median margins of the postgenae. Male terminalia of these two species are similar superficially, and may require maceration in order to resolve them. Terminalia of males of *C. truncata* include strongly sclerotized, blunt subepandrial lobes and phallic processes that are about two-thirds the length of the phallus, whereas those of male *C. elongata* include pointed subepandrial lobes and phallic processes that are subequal to the length of the phallus.

Description.—MALE: length including terminalia ca. 2.0–2.4 mm. General body color yellow. *Head:* nearly black, except yellow area on frons and yellow area approaching a stripe on mid ventral aspect of postgena (Fig. 6); gena yellow grading into black, with fringe of white hair; vertex and occiput black; mouthparts and palps yellow; bristles yellow. Antennal scape and pedicel yellow; flagellum yellowish brown, slightly darker apically; arista light brown. *Thorax:* long, slender (notopleural suture ca. ½ length of scutum and scutellum); yellowish brown dorsally, paler ventrally; bristles yellow. *Legs:* yellow; fore femur ventrally with 2 rows of black setulae, each flanked by row of 6–8 brown bristles (see Fig. 5); fore coxa lacking prominent basolateral seta, but with row of setae continuing distally (see Fig. 6). Wing hyaline; crossvein dm-cu present; cell dm closed (see Fig. 2). *Abdomen:* yellowish terga, sterna lighter yellow. Male terminalia (Fig. 13) yellowish, projecting anteriorly to abdominal segment 7; hypandrium and epandrium completely fused; cercus and epandrial lobe separate; cercus thicker apically, shorter than epandrial lobe; epandrial lobe slender, truncate and sclerotized apically, longer than cercus and shorter than phallus; phallus and phallic process slender, smoothly curved ventrally in lateral view, phallic process ca. ⅔ length of phallus. FEMALE: length including terminalia ca. 2.2–2.6 mm; flagellum brown, arista light brown; cercus long (see Fig. 11); spermatheca nearly hemispherical, with spermathecal duct arising from center of flat surface.

Type material.—HOLOTYPE male, labelled "Warwomen Cr. GA./Rabun Co. 1500'/31. VII. 1957/J. G. Chillcott" (CNC, holotype no. 21334). The specimen is in good condition and most of the diagnostic features of the terminalia are visible without maceration. ALLOTYPE, labelled "Rabun Bald, GA./Rabun Co. 3000'/14-VII-1957/ J. G. Chillcott" (CNC). PARATYPES. CANADA. Ontario: 1 male, Griffith, Jul (CNC). Quebec: 1 male, Hull, Aug (USNM). UNITED STATES. Georgia: 1 male (macerated terminalia in glycerin microvial attached to pin), Rabun Co., Jul (CNC). Kentucky: 2 males, Kentucky Ridge St. For., Jun (USNM). Minnesota: 4 females, 1 male, Basswood Lk., Jul–Aug (UMSP). North Carolina: 1 female, Looking Glass Rock, Pisgah Nat. For., Jul; 2 females, Macon Co., Jul–Aug (CNC). Virginia: 1 male, Alexan-

dria Co., Jun (USNM). Wisconsin: 1 female, Waupaca Co., Aug (UWM).

Distribution.—This species is largely sympatric with *C. elongata,* but it is known only as far south as the mountains of northern Georgia (Fig. 18).

Etymology.—The specific epithet is in reference to the structure of the subepandrial lobes, each of which is truncate and heavily sclerotized at its apex.

Concluding Remarks

Adults of species of *Chelipoda* are thought to be predacious because of their raptorial fore legs, but no records of prey capture exist. Collecting data on labels reveal that numerous specimens have been taken off flowers or foliage of plants infested with aphids. Other specimens have been swept off low vegetation, usually in forested areas, and some labels make reference to swampy areas and sloughs. In addition, specimens have been taken in Malaise traps, in yellow pan traps, and at lights. During the present study, adults of *C. sicaria* were swept and aspirated from understory foliage at higher elevations in Great Smoky Mountains National Park, where they appeared to be active only during mid- to late afternoon.

Larvae and pupae of only one species, the Palearctic *Phyllodromia melanocephala Fab.,* are described, having been collected in moist humus under beech trees in Europe (Trehen 1969). No immature stages of Nearctic species of *Chelipoda* have been described, but Harper (1980) presented indirect evidence that the larvae of three Nearctic species may be aquatic. During his study of insects in a Laurentian stream system in Quebec, Canada, Harper collected a few small series of *C. contracta, C. elongata* and *C. praestans* in emergence traps placed over streamlets, including one that was intermittent.

The findings by Harper (1980) and the discovery of relatively large numbers of adults of *C. sicaria* in a specific habitat in Great Smoky Mountains National Park, reported above in the remarks section pertaining to this species, could encourage future biological studies of this group which has received little attention. Awareness of an afternoon period of adult activity in a specific habitat, namely understory foliage, could facilitate study of both reproductive and predatory behavior. Knowledge of a probable larval developmental site for Nearctic species of *Chelipoda,* namely streamlets (including intermittent ones), will allow focused efforts to collect the immature stages, but special techniques will be required for specimens of such small size in order to pinpoint a specific microhabitat, if one exists.

Relatively few phylogenetically important characters have been revealed in the Hemerodromiinae, but components of male terminalia and shape of the female spermatheca appear to be of value. For example, preliminary evaluation suggests that *Chelipoda americana* and *C. limitaria* comprise a monophyletic group distinct from other *Chelipoda* treated here. This contention is not founded upon wing venation. Instead, it stems from their shared possession of a reniform spermatheca, lack of complete fusion of the hypandrium and epandrial lobes, and fusion of each cercus to a corresponding epandrial lobe. Importantly, adults of *Phyllodromia melanocephala,* the type species of *Phyllodromia* Zetterstedt established primarily on the basis of the lack of crossvein bm-cu, differ in other respects from those of *C. americana* and *C. limitaria.* Females of *P. melanocephala* lack the reniform spermatheca characteristic of *C. americana* and *C. limitaria,* and males of *P. melanocephala* possess a hypandrium and epandrium that are completely fused. The latter feature is characteristic of males of other Nearctic *Chelipoda* treated here and of males of other Palearctic *Chelipoda.* Consideration of these characters, together with awareness of variation in wing venation of other hemerodromine species, supports the contention that the present concept of "*Phyllodromia*" based

on wing venation is most likely invalid. Such awareness also leads to the conclusion that the present taxonomic status of other genera included in the "Chelipodini" (for example, *Afrodromia* Smith, *Chelipodozus* Collin, *Doliodromia* Collin, *Monodromia* Collin, and *Ptilophyllodromia* Bezzi) might be questioned also, since they too are based largely on minor differences in venation. Drawing upon the interpretations of homologies of male terminalia outlined in Cumming and Sinclair (1990), taxa presently allied with *Chelipoda* and *Phyllodromia* appear to constitute the sister group of the remainder of the subfamily Hemerodromiinae, but the groundplan of the subfamily has yet to be established.

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